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ABSTRACT

The University of Illinois' PLATO Elementary Program, which was observed and evaluated for two years, was the focus of Part 1. The major PLATO features were described and the PLATO elementary reading and mathematics demonstrations, representing attempts at sequential and concurrent hardware, software, curriculum, and implementation development of tutorial computer assisted instruction, emphasized. The PLATO staff was composed of volunteers because of the perceived importance of teacher commitment to the program. This method of selection caused several problems. The orientation of PLATO staff varied with implementer's views of proper teacher contribution to the program. Judgments on the effectiveness of teacher orientation and the relationship between that process and the eventual development of the innovation were inconclusive. In Part 2, the theoretical components of the degree of PLATO implementation and classroom observation were discussed. An effort was made to sketch the evolution of one of the observation instruments being employed to observe the effects of PLATO on the life of elementary classrooms, the conditions and hypotheses under which it has been developed and used, and one illustrative result concerning implementation. (BJG)

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The Introduction of Innovative Instructional Systems:

Implementation and Program Evaluation

I. The Practitioner: Selection, Training, and Program Evaluation

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TM005 109

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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The persistent and hydra-headed attempts in the past to improve elementary instruction may be roughly divided into two unequal parts. The smaller number of innovations aimed at broadly conceived teacher development, as attempting to change teachers and their instructional ways by enriching their understanding of subject matter, improving their diagnostic and managerial skills, or increasing the repertoire of their interactions with students. The affective education movement, the Academic Year Institutes, and the open education advisory services are examples of such efforts. By far the greater number of moves toward reform were those that sought to bypass the teacher, seeking instead to affect students through the mediation of curricular materials or activities. Thus the curriculum reform movement engaged the issue of teacher development only to the extent that productive implementation of new materials was seen to depend on some concomitant training of the teacher. Of course, neither approach ever came to pass in pure form, but a careful scrutiny of goal statements and patterns of resource distribution reveals the developers' leanings. The failure of materials intended to be "teacher-proof" is a tale so often repeated as to require no retelling here. There is no plethora of successful teacher development efforts to point to, except to note that this effort never received the same attention and largesse of resources as did the area of curriculum development.

The PLATO Elementary Program

The undertaking we shall talk about here is one we have been observing and evaluating for close on to two years. It had the development of curricular

materials, in this case programs delivered over an interactive computer system, as its main objective. The developers, however, professed a view of the teacher's role as critical to the effective use of these programs. Under optimal conditions the materials would be integrated with ongoing curriculum, modified by the classroom context, even shaped by the needs, goals, and style of the teacher. This project thus sought to combine educative functions for students and teachers, albeit with far more articulated plans for the instruction of students, with teacher education largely serving program implementation.

As the PLATO project is an effort unique in scope and character, a brief description of its main features is offered to frame our subsequent observations. The PLATO elementary reading and mathematics demonstrations represent ambitious attempts at sequential and concurrent hardware, software, curriculum, and implementation development of tutorial computer assisted instruction in elementary schools. Since 1960, the engineering and systems development of the PLATO system and TUTOR teaching language has been under way at the Computer-Based Education Research Laboratory of the University of Illinois, with much in-house experience acquired over the years in authoring university-level lessons and sophisticated simulations and games. While some elementary mathematics units had already been developed for earlier versions of PLATO, it was only in 1972, with the awarding of funds from the National Science Foundation, that development of PLATO in lesson sequences covering significant portions of the beginning reading and 4th to 6th-grade elementary mathematics curriculum was undertaken. The PLATO system, with nearly 1,000

terminals connected to a CDC Cyber 70 computer in Urbana, is able to make a substantial library of lessons available to any user on call, constrained only by the system's extended core storage capacity. The PLATO terminal is a device with a typewriter-like keyboard, a "plasma" screen, internal character memory, impressive graphic and slow animation capability, rear projection of color microfiche images, computer-controlled random access to disc-stored audio messages, and the ability to sense the portion of the display touched by the student. Although development and improvement continues on hardware and system features, the system is now sufficiently stable to permit the orderly introduction of the still-developing curriculum into the elementary school classroom.

The many unique features of the project should not mask the fact that the development and implementation issues emerging from the evaluation have relevance beyond the specific medium of instruction in use, the means chosen to carry them out, and the actual course of implementation. A good understanding of the developers' conceptions and intentions can prove enlightening about innovative curricular programs across a range of conditions.

We should like to describe the issues of teacher selection, orientation, and early support in some detail. These are common concerns in most implementations of curricular change. They can, however, be handled or solved in a variety of ways, depending on the implementer's convictions, goals, skills, and situational constraints. The strategies deployed by the PLATO project will serve to illustrate some of the assumptions and consequences of these tactics, which shall be examined here.

While we will be sharing some tentative observations about the first phase of the project, the question persists of how an effort of this scope and complexity may be appropriately assessed. The meaningful questions to ask, processes to observe, methodologies and tools to use, audiences to address, remain open issues. Our impressions and the assessments we will make are based on varied informal sources of information--they were culled from documents, telephone conversations, formal meetings, and even encounters at the coffee urn. Our formal systematic data collection was done via five avenues: an in-depth interview of teachers, classroom observations, system data, teacher logs, and norm-and content-referenced attitude and achievement tests.

The teacher interview, semi-structured and open-ended in format, sought to gain access to the teachers' pedagogic constructs, especially those related to math or reading. We also solicited the teachers' perceptions of their own classrooms, the teaching role, children as learners, and related matters that were judged relevant to the utilization of a new teaching aid. The teachers were also probed for their expectations of and predispositions toward the new resource.

The interview had been originally designed by the Early Education Group at ETS for a study of teachers working in open-education settings. This instrument was revised with the needs of the present evaluation in mind, with the addition of PLATO-related questions, as well as extensive probes of the teacher's conceptions of math and reading. Only a small portion of the interview data will be reported here; i.e., information primarily dealing

with the teachers' entry into the program and their perception of early orientation efforts.

The rationale and the development of the means for classroom observations will be described in detail in the next section of this paper, thus setting the context for the investigation of mode of PLATO use and nature of classroom integration.

The log, although not kept by all teachers, and irregularly by those who did keep it, yielded valuable information, from the teachers' perspective, on life with a neonate innovation. The data yielded by the logs will not be attributed to their specific source.[1]

Selection of Participants.

One of the early decisions program developers need to make is to identify and select those who will try out the innovation. The users of curricular materials are school districts, i.e., superintendents, principals, teachers, pupils, and parents. While the teachers and pupils are most directly affected by new programs, administrators and parents are recipients of important secondary benefits or losses, and at times have significant input into decisions of acceptance or rejection.

After initial negotiations with more distant urban and rural school systems, the directors of the elementary PLATO projects took a consequential step when they approached the two school districts adjacent to the University where the program was being developed. Several advantages accrued to this choice. The districts had a long histroy of University connections;

1. We will not report on test data in this paper.

they had often served as testing ground for a number of previous and ongoing projects. The schools were accustomed to, or at least familiar with, the disruptions and intrusions that accompany pilot projects. Ready access to the schools made information flow between the user and project staff with greater frequency, richness, and shorter turn-around time.

School personnel were not unaware of the benefits, direct and derived, that cooperation with the University and some of its renowned educators could bestow. In addition to the direct benefits of "free" access to an expensive and locally high-status resource, there were the less tangible rewards of stature by association and, on occasion, the availability of educational and material resources that were only tangentially related to project needs. On balance, however, it appears that the association at this stage benefits PLATO staff more than the schools. A tacit recognition of the debt incurred is sometimes made manifest in project decisions about distribution of resources. As an example, even in classes where the terminals are judged to be used only marginally, PLATO staff have not made unilateral decisions to remove the resource if the teacher wants it and has invested energy in incorporating it into the classroom.

The convenience of trying out ideas, methods, and materials in one's own backyard may, however, be offset by other consequences of this strategy. The easy and frequent access to the implementer may foster dependency on the part of the user, who then does not invest the requisite effort in acquiring facility with the resource, thus giving the evaluator a false impression of the cost involved in assimilating it into the classroom. The implementor on the other hand, is not pressed to articulate and develop,

in publicly accessible and exportable forms, the skills and knowledge necessary for the effective use of the resource, making ultimate dissemination on a broad scale less probable. It should be pointed out that extensive documentation of the lessons themselves has occurred, particularly in the case of elementary reading. Equally extensive orientation, training, and support material are, however, not yet in evidence.

Thus, the major drawback, from the evaluators' perspective, of implementing close to home is that it is difficult, if not irresponsible, to generalize to less hot-house-like conditions, when the program must stand alone without the facilitating presence of its own developers. For research and inquiry, when wider dissemination is not a consideration, this can be a viable, even preferred choice. For a program slated for broad dissemination, it may still be appropriate to conduct field trials on familiar ground. Only when a field demonstration is intended to simulate the probable conditions of future implementations would such a strategy be questionable.

The choice of schools within a district has equally important effects. Schools may be chosen with a population of students and teachers that could unduly facilitate or hinder the acceptance of a program. The student body may closely resemble or diverge widely from the target population of the program. The PLATO projects did not per se select schools as sites for introducing the program, but it must be acknowledged that the strategy of teacher selection did increase the likelihood of certain schools, rather than others, becoming pilot sites.

The selection of classrooms to house PLATO terminals was done indirectly, via the selection of teachers. A district-wide notice went out ostensibly to all teachers (some principals were more thorough in transmitting information to their staff than others) informing them of the program, and soliciting volunteers for field trials. Relying on volunteers to make room in the class for programs in their early developmental phase is a common approach, reflecting assumptions, some of them quite unexamined, about the teaching role, forces motivating teachers, the organization of schools, and more.

The basic assumption underlying the volunteer strategy is the importance of teacher commitment to the program. The developer wants the teacher to be on the program's side, investing it with positive expectations or at least protecting it by suspended judgment. The implementor also wants the teacher to be willing to commit the effort that introducing the program requires, an effort which is often nontrivial, involving understanding the developers' intentions, learning new instructional techniques, rethinking previously held constructs, and putting up with the frustrations that inevitably accompany the shakedown phases of any innovation. How to maximize the likelihood of these conditions for implementation? The inference seems reasonable that if a teacher comes forward, offering to give the program a home in her classroom, she is well motivated to explore its potential, and is likely to share the program's approach and goals.

On the face of it, an eminently plausible assumption. But in an extended interview, when probing teachers' reasons for volunteering to participate in the PLATO project, we found a remarkably catholic set of motives, not all of which related to an interest in trying computer-aided instruction in the classroom. A sizeable number of the teachers could be classified as "high innovators," i.e., teachers who have a history of participating in a variety of new projects. But there were a few teachers who had no affinity with the subject matter that was to be computer-aided and hoped to be relieved by the computer of responsibility for teaching it. Others hoped that the computer would prove helpful to particular children with whom the teacher felt ineffective. The teachers with the more intrinsic reasons for participating divided among those who felt in need of help with their teaching of reading or math, and those who were interested in learning about new approaches to instruction, seeing the program as an opportunity for professional growth. There were teachers who volunteered for idiosyncratic reasons; one joined the program because it ensured her stay in the same school till retirement, others wanted to enlarge their community of interest in computers with a friend or spouse. House (1974) has suggested that the prospect of career advancement is a major motivating force of entrepreneurs and early users of innovations. Among the PLATO elementary teachers, given the flat career ladder of elementary schools, this was a negligible factor, applicable mainly to the rare male teacher - incidentally putting into relief the fact that perceived differential opportunities for the sexes persist in these institutions.

House, Ernest R., Politics of Education Innovation. California: McCutchan, 1974.

The strategy of selection by volunteerism, then, did not entirely serve its intended purpose -- it did not assure the most receptive conditions for the program in its first time out of the laboratory. An alternative strategy, that of scanning the district for teachers with a special interest in the new instructional aid might have led to recruiting teachers with more relevant motivation. Thus, the appropriateness of a strategy is context-dependent, with the implementor needing both the foresight and a relatively clear understanding of priorities to make a reasoned decision.

Yet another consequence of relying on volunteer practitioners was the foreclosure of independent choice of the pilot schools. Most of the "high-innovator" teachers were from two schools that have traditionally been hosts for programs emanating from the University. Although both schools had a cross section of SES represented in the student body, the children of University faculty, and indeed of PLATO staff, were a conspicuous presence. The schools were also receptive to innovation, tolerant of the attendant disruptions, flexible regarding instructional styles, and not focused on a single mode of assessment, viewing achievement test results as but one, and not necessarily the most important, indicator of children's progress.

The program subsequently fanned out to other schools in the district, but only now, in its third year, is the math program significantly present in two schools that are largely composed of low-SES children, even though potential benefits to this population were identified early as a project goal.

Orientation of Participants.

The recruitment strategy gains significance when the question of teacher preparation is confronted. The developers need to define the role that they expect the teachers to play, they must consider the qualities of the teachers already recruited, assess their working environment, its supports and constraints, and take account of the implementation's own resources to bring about a favorable confluence of givens and aims, despite the invariably limited means for teacher orientation.

It is a rare implementor who approaches this task with the requisite humility and wisdom. It is a rare implementor, too, who gives the task its full due. Few responsible programs nowadays neglect it entirely, remembering the history of the golden age of curriculum development projects of the 50's, when materials and teacher's guides were often regarded as sufficient for curriculum improvement, and the teacher's sensitive role was grudgingly acknowledged only when the expected improvement failed to materialize.

Views of the teacher's proper contribution to program implementation vary widely among developers, and interact significantly with the pedagogic notions underlying the materials. Programs with narrowly defined and circumscribed use tend to provide teachers with a "script," expecting only a faithful rendering of the prescribed behaviors. Preparation for implementing such programs falls under the rubric of "training" rather than "education." Programs with greater flexibility of use entail

some teacher familiarity with program purposes, which presumably overlap with the teacher's own curricular concerns. Thus the developer, in his interactions with teachers, needs to take some account of their perceptions and conceptions and, if necessary, shape these to benefit the implementation. This process may be a short move away from training or a long one, depending on the complexity of the requisite understandings, the teacher's entry state, and the weight given to the teachers' role. In the case of richly and broadly conceived programs, where a high level of teacher input is posited, developers are wont to select teachers with the desired qualities, rather than face the uncertain prospect of educating.

The two elementary projects differed somewhat in their views of and plans for teacher preparation. The math group was staffed at the start of the Contract by a small core of former teachers with extensive experience in developing and implementing an innovative mode of math instruction. They came to the PLATO project with tested convictions about the teaching of mathematics, ready to explore the computer as a vehicle for the expression of their precepts.

The math staff had originally anticipated extensive summer workshops for teachers, which would deal not only with the logistics and pragmatics of incorporating computer terminals into a classroom, but substantive questions in mathematics as well. These elaborate plans were not realized. The request for additional funding for teacher training was only partially successful, and the available project funds were not reallocated to cover the training effort. Also, teachers were reluctant to give up summer weeks,

especially without acceptable reimbursement.

Training for the math group evolved into a varied set of interactions between PLATO staff and teachers. A two day meeting was held in the summer, along with varied levels of self-scheduled working at the terminal by individual teachers. Throughout the year, after school meetings were held with all the volunteer teachers. In addition, staff members were available to spend time at the terminal with individual teachers, who used this opportunity in diverse ways. All went through some of the available lessons, and learned how to access the student data kept by the system. A few explored some of the system's capabilities. Math staff also spent considerable time in classrooms, with children and teachers, helping smooth the transition, observing the interaction of programs and children, troubleshooting for the frequent hardware and software problems during the first months.

The reading group represented a more diverse set of backgrounds and interests. They shared some teaching experience, but not with a focus on beginning readers. The group's approach to the reading process was analytical, leading to the identification of a set of skills that were assumed to be prerequisite components of the ability to read. The programs were aimed at the development of these skills. Although the reading group expressed intentions of forging these relatively discrete skills into an integrated model of the reading process as a result of working with children on PLATO, during the first wave of teacher orientation there was no perceived need to imbue teachers with a particular view

of the process of learning to read.

The reading and math staff also differed in their relation to the computer. The same members of the reading group programmed lessons as well as the course-specific control system -- in the math group the router programming and curriculum design functions tended to be separated. The reading group on the whole had more interest in using the medium to its full potential, and conversely, in living within the limitations imposed by it.

The mode of teacher orientation was related to these predispositions. A substantial amount of programming was invested by the reading staff in the preparation of on-line training materials, which were intended to familiarize teachers with the relevant workings and capacities of the system, as data collector and storer, diagnostic aide, as well as tutor. In addition, teachers were encouraged to go through the available lessons in the student mode.

The programmed materials proved to be drastically underused. The reading group, much like the math group, found face-to-face interaction with teachers and students the most effective and probably indispensable mode of orientation. As the majority of the core reading staff worked almost exclusively on programming, two experienced persons were engaged for the important task of classroom liaison. With the exception of one member of the reading team, a significant part of teacher and child orientation was carried out by new staff, who themselves had to be oriented to the program's rationale and intent.

The overall picture of teacher orientation for both projects summarizes to an uneven effort. Training varied from teacher to teacher, as a result of the staff's desire to respond to individual needs and interests, and the consequences of the hazards of "early chaos."

The quality and direction of the effort was consistent with the developer's priorities, which centered on curriculum design. Neither group undertook broadly conceived teacher development, even though each asserted the interrelationship between the use of programmed materials and teaching modes. The resolution attempted by the math program was aimed at attracting exemplary teachers, the reading program, also working with volunteers, sought to create programs that did not require extensive teacher involvement.

Judgements on the effectiveness of teacher orientation and the relationship between that process and the eventual deployment of the innovation are forbiddingly risky to make. A possible way to assess training procedures is to scan the intersecting areas between training foci and the intended audiences' concerns. Taking a first step in that direction, we distilled from the interviews the teachers' expectations regarding mode of PLATO use, and the anticipated benefits and apprehensions associated with the prospect of utilizing such a resource. We ordered the range of expectations into a tentative framework that may be used to place an individual teacher's expectations, or actual modes of use, as well as to summarize groups of teachers along the same dimensions. This framework is presented in Table I.

TABLE I.

Modes of PLATO Use, Anticipated/Actual

A. POSITIVE EXPECTATIONS/USES

1. Instructional/subject-matter focus

Intent in Use	Pattern of Use: Tutorial/Expository		Drill and Practice/Review	
	Supplantive	Supplemental	Supplantive	Supplemental
Instructional (CAI)				
Record Keeping/ Retrieval (CMI)				
Enrichment				
New Teaching Mode				

2. Diagnostic - additional context for learning about students:

1. for its own sake
2. to lead to more effective PLATO utilization
3. to lead to better use of other resources
4. more effective communication with parents

3. Instructional - additional focus

1. motivation
2. acquisition of good work habits, increased attentiveness
3. computer literacy
4. medium for encouraging cooperation/helping among children
5. sense of accomplishment resulting from controlling complex system

4. Classroom management

1. reward
2. control
3. isolation
4. behavior shaping

B. NEGATIVE EXPECTATIONS/USES

1. Distortion of child's conception of the nature of math or reading
2. Fear of PLATO takeover
3. Discipline problems
4. Disruption of class routine
5. Increased competitiveness
6. Physical strain
7. PLATO encouraging autistic trends

The framework incorporates the whole range of expectations encountered among this group of teachers, most unfamiliar with computer-aided instruction, as well as impact anticipated by the developers and evaluators. Educationally trivial or unrealistic expectations were not screened out of the list.

The two-dimensional category related to instructional use with subject matter focus distinguishes between supplantive and supplemental use. Neither program as yet accepts supplantive responsibility, where instruction of a segment of the curriculum is entrusted to the computer programs. Supplemental use, where students interact with the programs in addition to their regular classroom instruction can subsume a wide range of expectations, and may be broken down further if the responses warrant it. Both modes can be envisioned as serving either tutorial, explicative use, where new concepts or methods are introduced, or drill and practice, aimed at reinforcing concepts previously introduced to the student.

Although the teachers differed in the degree to which they articulated suppositions, on the whole their ideas about the nature of the resource they elected to try were vague and undifferentiated. A great diversity of expectations emerged among the teachers, which may be related to the early lack of firm information about the capabilities of the system and the characteristics of the programs. The implications for training are that if PLATO is the inkblot that it appeared to be to teachers, orientation will need to be broad indeed if it is to speak to all the concerns of all those concerned.

Section II

Degree of Implementation and Classroom Observation

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Disillusioned by the questionable ecological validity of laboratory research in learning, and by the lack of even replicability of traditional field educational research, in which tests and questionnaires separate the investigator from the behavior under study, forming a wall of paper impermeable to any but the strongest signal, a growing band of researchers is returning to the classroom to watch the behavior of interest itself. It is fashionable to speak of the need for a phase of natural history before any further theory construction.

Evaluators are not immune to this trend: Cronbach, Stake and others have emphasized a reportorial function for evaluation, and even those who demur at restricting evaluation to a descriptive role acknowledge the importance of process, as well as product (Guba, 1975).

While this recognition of the importance of getting close to the phenomena is commendable, it is often accompanied by the hope that insight will automatically emerge from studying complete behavioral records. It won't. Simply counting unintegrated behaviors without considering their contexts or arbitrarily imposing one's own context as a way of limiting the range of behaviors considered important ignores a central issue in the study of behavior: the problem of determining the functional units of behavior in contexts as experienced by the organism. We do not claim to here contribute to resolving that issue; we merely insist that it not be swept under the rug in discussions of observational techniques for evaluation.

Surely the script and stage directions for a play constitute as complete a record of surface behavior as any practicable observation technique

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Guba, E. G. Problems in Utilizing the Results of Evaluation. Journal of Research and Development in Education, 1975, 8(3),42-54.

could be expected to produce. Yet actors spend far more time in trying to get into their role, exploring the character's motivation and dynamics, than in simply reproducing lines and gestures. The number of interpretations available of Iago's "behavior record" gives the lie to the new critics' hope that internal evidence is sufficient to determine explanation. In spite of this difficulty, to study of the staging of any project requires attending the performances.

Having set the stage for the confrontation of PLATO system, children and teachers, we take our seats and await curtain time, somewhat apprehensive at the prospect of following the action of a play in the naturalistic genre in which characters seldom explain their actions.

Before this metaphor collapses under its own weight, let me point out that it represents an attempt to evoke some of the limitations and frustrations inherent in naturalistic observation as a technique for gathering evaluation data. Observational methods can chronicle and rate pervasive[1] patterns of overt behavior, but cannot get beyond the behavior and into heads, where presumably the activity of major interest is taking place. For this reason, we will attempt in later reports to coordinate information gained from observation with that provided by other data sources.

The results are not yet in, let alone coordinated, and despite the increasing pressures on evaluators to emulate the reigning drama critics by filing a judgment on opening night, we plan to continue to examine the dimensions on which judgments ought to be made and to pursue new sources of relevant information as the play continues to run. Rather, we'll try to

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[1]As Medley pointed out, to the extent that rare, "peak" experiences are determinants of outcome, they are unlikely to be captured by intermittent classroom observations.

sketch the evolution of one of the observation instruments being employed to observe the effects of PLATO on the life of some twenty elementary classrooms, the conditions and hypotheses under which it has been developed and used, and one illustrative result concerning implementation.

We assume we are preaching to the converted on the issue of the importance of assessing degree and mode of implementation. A reasonable consensus exists on the impossibility of interpreting outcomes in ignorance of how or even whether "treatments" were, in fact, applied. A case can be made that the study of varieties and impacts of approaches to confronting and integrating a potentially valuable but possibly demanding new resource is most germane to policy.

We see it as our responsibility to go beyond the function of a CAI consumers' report, providing information relevant to an administrator facing a decision to purchase or reject the system in its present form. We must attempt also to identify the issues and important determiners of mode of use in the hope that when someday the developers of "WITTGENSTEIN I" appear with an even more sophisticated technology, they will not be faced with reinventing the wheel in their attempts to implement their system to test its effectiveness in school situations.

While it would be consistent with some traditions in evaluation to lay out our a priori analysis of all questions important for the evaluation, a theory relating mode of implementation to outcome, and to proceed to show how an evaluation instrument was logically derived from these considerations, the actual process has been considerably less antiseptic. Bumping up against the phenomena being evaluated continues to modify our assessment of what should be looked at and how.

The observational approach employed in this evaluation was developed during and in response to the less-than-optimal early implementation, with initial observations taking place during the first pilot testing of the systems in three classrooms one year ago. The first observations were the third author's attempts to characterize the teachers' classroom organizations and styles, which were later coupled with detailed narratives of individual children's behavior at the terminal. As these preliminary field reports arrived at ETS, they were studied and discussed in an attempt to identify dimensions of variation and possibly significant indicators of mode and effectiveness of use. Additional questions and areas of focus were suggested by the observers and the Princeton staff and an iterative process of instrument development began. While it was clear that design of a specific instrument, tailored to the features of the PLATO system was essential for the recording of individual child interaction with the system, it had been hoped that an existing instrument for observation of the classroom as a whole would prove appropriate to the task of characterizing those variations in teacher approach that might affect mode of implementation, outcome, and acceptance. None of the instruments catalogued in Mirrors for Behavior seemed to capture enough of the richness evident in the narrative reports that were being collected, but the problem of reducing such material to manageable summaries required that a coding scheme be applied, either to the narratives themselves, at one remove from the phenomena under observation, or by the observers. Thus was born yet another observation checklist, designed to supplement, but not to replace observers' running accounts. The early hope that a real-time checklist could be designed which would obviate the need for most of the narrative, leave room for

recording unanticipated events, and yet retain the contextual information necessary to assess the significance of a given behavior, proved optimistic.

The current truce, worked out with the lively input of the two field observers (the third and fourth authors), involves a post-observation checklist designed to save some writing in the narrative, to provide opportunity for judgments of frequency of commonly-seen behaviors, and for more global judgments of pervasive classroom style, but is not based on the assumption that the narrative can or should wither away.

The development of the instrument for observing individual children (appendix A) at the terminal was a relatively straightforward process of creating a form to record behaviors that were characteristically noted in narratives. This interaction is seen as a process to be observed for overt indications of the child's attitudes, comfort and ease of use, pace, interest, task orientation, and understanding. To some extent, these represent evaluative dimensions in themselves, as well as being causally linked to amount of learning likely to be taking place.

In the case of the observation of the classroom setting, the situation is less straightforward. Of the countless perspectives from which the transactions and activities of life in classrooms can be viewed, few consistent relationships among identifiable teaching styles or acts and pupil outcomes have emerged. Rosenshine and Furst (1973) point out that although earlier reviewers of classroom observation methodology and findings wrote

> "in the hope that observational instruments would be used in correlational and experimental studies where the criterion was student gain, and that such studies would involve a cycle of probing and refinement which would improve both instruction and student growth. Unfortunately this research has not been done to any great extent. Instead, as has been demonstrated, the

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Rosenshine, B., and Furst, N. The Use of Direct Observation to Study Teaching. In R.M.W. Travers (Ed.) Second Handbook of Research on Teaching. Chicago: Rand McNally, 1973. Pp. 122-183.

> major use of observational instruments has been to describe teaching and train teachers in skills of undocumentated value. Such activities are necessary but not sufficient". (p. 162)

We might question even the necessity of the latter of these two activities, but it seems to remain the case, as it was noted by Medley and Mitzel a dozen years ago, that we don't yet know how to tell effective teaching by looking at it.

This assessment of the situation led us to an eclectic approach, with piloting of a number of existing instruments due to D. Solomon, Soar and Ragosta, Brown, and Trismen, Wilder, Nalin, Weinberg and Hardy. Previous experience in the analysis of a low-inference category instrument had led one member of the team to agree with Rosenshine and Furst that higher-inference sign, rating and global judgment techniques of data recording offered the current best hope of adequate adaptation of the data recording process to the context of behavior. Our position is that at this stage of knowledge we should build on the observational skills that intelligent human beings must possess to survive, (Heyns and Lippitt, 1954) rather than attempt to constrain them to simulate mechanisms with the limitations that go with the reliability of clockwork.

The process of trying, modifying or rejecting items from all of the above sources and even a few of our own, with much discussion and patient pointing out of gaps, hard cases and impossible distinctions by the on-site half of the team, led to a 155-item checklist reproduced in Appendix B.

Heyns, R. W., and Lippit, R. Systematic Observational Techniques. In G. Lindzey (Ed.) Handbook of Social Psychology. Cambridge, Mass.: Addison-Wesley, 1954. Pp. 370-404.

Built into the checklist, besides notations of certain physical characteristics of the classroom, materials and curriculum approaches are several sets of items designed to provide measures of constructs derived from previous research, constructs related in specific hypotheses with which we approached the evaluation of these implementation efforts. Among these are the constructs of Teacher Behavioral Control, Teacher Cognitive Controll or Input, Breadth vs. Narrowness of Focus, Degree of Pupil Cooperation, and Teacher Involvement with PLATO.

A major hypothesis relating these constructs arose from the modes of implementation actually adopted. While a terminal room capable of handling a whole class of children at a time was for a while contemplated at one high-innovating school with a large number of PLATO classes, the option was rejected in favor of placing 1,2, or 3 terminals in each reading classroom, and 4 in most mathematics classrooms. The consequence of this placement strategy is that if all children in a class are to have their 15 minute or half-hour turn on PLATO each day, some children must be using the terminals at almost all times. Thus we hypothesized that irrespective of the relationship of the curriculum to the teachers' goals, teachers high in attention to behavioral control, particularly those who were accustomed to working with the whole class in a single group much of the day, would find PLATO intrusive and demanding without extensive in-service training in new modes of classroom organization. Since the training provided was focused on the mechanisms of system and lesson operation, with classroom organization aspects being left to the ingenuity of individual teachers, the hypothesis leads to the specific predictions that teachers high on the control dimension

are likely to be low on PLATO acceptance, while those more in tune with open, individualized, or even only "reading group" techniques would tend to be able to integrate PLATO terminals more easily into the congeries of resources they were already managing.

A second hypothesis dealt with teacher's level of cognitive input, as distinguished from behavioral control. It was felt that nearly orthogonal to the dimension of strict or loose classroom behavioral management should lie a dimension of activism or even instrusiveness with respect to the children's learning. It was argued that the teacher high on this dimension would be likely to evaluate PLATO lessons carefully, and accept or reject the system in terms of its perceived educational value for individual children. The delays that led to the sequence: graphing, whole numbers and then fractions in mathematics, and the fact that many first graders among the PLATO demonstration classes enter knowing how to read, was expected to lead such teachers to be critical of PLATO, if not to reject it for certain children.

Finally, because of the clear link of lesson materials to behavioral objectives corresponding to an analytic view of reading, and the much more free-floating goals of many mathematics lessons, it was hypothesized that reading teachers having a "narrow focus" in instruction would react more positively to the reading curriculum, while those mathematics teachers with a narrow focus (differently defined) in their instruction would react less positively than would their counterparts with a broader conception of children and curriculum.

Preliminary examination of the results of the first two rounds of classroom observations (n = 38) completed in the fall of 1974, suggests that

some constructs fare better than others, and that while one hypothesis cannot be rejected, the others cannot yet be tested. Validation of these scales was carried out on the 57 observations of rounds 2,3, and 4, and alphas and interscale correlations were found to remain quite stable.

Tables 1 - 5 give the items making up the control, input, narrow focus, and PLATO scales, item-scale correlations, and coefficient alpha measures of consistency of the scales formed of the sums of the standardized items of the validation set.

Insert Tables 1 - 5 about here

As is apparent from their reliabilities the scales varied in the degree to which they hang together, with PLATO involvement being the least well-measured construct. Nevertheless, the reliabilities are acceptable if the scales are indeed measuring different things.

Table 6 indicates that most of them are not.

Insert Table 6 about here

In particular, Scale 1, Teacher control, and Scale 2, teacher input, intercorrelate as high as their reliabilities permit, indicating that we have not succeeded in retrieving independent measures of the two behavioral patterns, or possibly that in this sample at least, they are not in fact independent. The "narrow focus" scales relate to teacher input and consequently inter-relate more strongly than one would prefer, although less strongly to behavioral control.

The correlation between the narrow focus scales in math and reading is of course spuriously inflated by the fact that they share items. Thus until the scales have been refined into more nearly individual entities, or,

as is more probable, the separate construct of teacher "input" is abandoned and combined with teacher control, we have no evidence that we are dealing with more than one dimension. While the fact that teacher control relate slightly negatively ($p<.15$) to the PLATO involvement scale tends to support one of our original hypotheses, the possibility that this pattern of judgments reflects a bipolar evaluative dimension contrasting high PLATO valuers with "bad guys" cannot be discounted at this stage. To the extent that data from the teacher interviews and system records of actual usage confirm this preliminary finding, and to the extent that the application of analytic methods reveal a more differentiated structure in these and later observations, the hypothesis that we are chasing a halo effect will be infirmed. The narratives and observers' summaries suggest that observers do not attach any particular "halo" to PLATO use. If more thorough analyses support substantive findings in this area, their importance will be in the realm of refining the tautology that "traditional teachers" resist innovation. Few of the volunteer teachers in this sample could be characterized as "traditional" in any simple sense of the word. The specific beliefs and behaviors that go with a teachers' acceptance of the heavy demands inherent in making her classroom a proving ground for a new technology need to be understood if we are to hope to separate the potential of the play from the idiosyncracies of the actors in any particular production. Classroom observation, coordinated with interview and test data, shows promise in helping us in the task of clarifying and ultimately assessing this potential.

Appendix A

Individual Child at Terminal

Observation Checklist

Teacher _____ School _____ Date 3 24 75 Mo/Day/Yr.

Time 9:10-9:20 Child's Name _____ Observer _____

STUDENT INTERACTION WITH TERMINAL

Except where indicated otherwise, coding is:

1 = none or never
2 = low level or seldom
3 = medium level or sometimes
4 = high level or often
5 = extremely high level or constantly
blank = no opportunity to observe

Lesson Identification (describe)

A Happy Easter	C The Chicken Roads Touch Sensitive
B Today is ___	D Plato System Down.

A. PROCEDURES AND CONTENT

	A	B	C	D
1.* Child's understanding of directions	5	5		
2.* Child's understanding of content	5	5		
3. General impression as to difficulty of lesson (1 = too easy 3 = about right 5 = too hard)	3	3		

4. What do you think was source of any difficulty child had with lesson?

_____

B. AFFECTIVE REACTION

Non verbal expressions of attitude:

5. Attention to PLATO terminal (1 = no attention 5 = all attention)	5			
6. 1 = bored 5 = highly involved	5			
7. 1 = tense 5 = relaxed	5			
8. 1 = discouraged 5 = confident	5			

Verbal expressions of attitude while on PLATO:

[1 = very negative 3 = neutral 5 = very positive]

9. To self	–			
10. To other children	–			
11. To teachers	–			
12. To PLATO	–			

– = nnl

*Coding elaborated on attached sheets.

Note: A,B,C,D refer to separate lessons. If rating for item is same across lessons, rate only under lesson A and leave rest blank.

C. RESPONSE STYLE

[1 = child never acts this way 5 = child constantly acts this way]

		A	B	C	D
13.	Impulsive - makes response before looking or thinking	1	1	1	
14.	Hesitant	1	1	1	
15.	Slow but confident	1	1	1	
16.	Fast and accurate	5	1	2	
17.	Self-motivated and purposeful in approach	1	1	1	
18.	Tries to "beat system" (touching happy face to go on without reading, giving wrong responses to wait for machine to correct him, etc.)	1	1	1	

D. MECHANICAL DIFFICULTIES

19.*	Child facility with typing	5	1	1	
20.*	Child facility with managing audio device	3	1	1	
21.*	Child facility with managing microfiche	—	—	3	
22.	System failure occurs (1=never 5=constantly)	1	1	1	Plato goes off. System wide!
	Where in lesson? _____				
23.	Other hardware failures occur (1=never 5=constantly)	1	1	1	
	What kind? _____				
24.	Length of wait for lesson changes (1 = none 3 = acceptable 5 = excessive)	3	3	3	

E. REQUESTS FOR HELP

25.	Proportion of time that C is assisted (1 = never 3 = several minutes 5 = constantly)	1	1	1	
26.	Request for help made to teacher [1 = never 3 = several times 5 = constantly]	1	1	1	
27.	T responds by "doing for"				
28.	T responds by guiding or giving information				
29.	T acknowledges request but doesn't help				
30.	Request made to other child(ren)	1	1	1	
31.	C respond by "doing for"				
32.	C respond by guiding or giving information				
33.	C acknowledge request but don't help				
34.	Request made to CERL staff member	1	1	1	
35.	S/he responds by "doing for"				
36.	S/he responds by guiding or giving information				
37.	S/he acknowledges request but doesn't help				
38.	Request made to ETS observer	1	1	1	

Interaction with child is initiated by:
[1 = never 3=several times 5=constantly]

		A	B	C	D
39.	Teacher				
40.	CERL staff				
41.	Other adult				

F. OTHER CHILDREN AT TERMINAL

		A	B	C	D
42.	Other children spend time around terminal				
	Children comment on or talk to child at terminal about:				
43.	PLATO procedures				
44.	PLATO content				
45.	unrelated matters				
46.	Children interact with child at terminal in disruptive or interfering way				

ELABORATION OF CODING

1. 1 - Child has so much trouble understanding directions that s/he gives up.

   2 - Child has great difficulties in understanding directions and asks for help.

   3 - Child has some difficulty in understanding directions, but gets by.

   4 - Child has only a little difficulty understanding directions.

   5 - Child follows directions quickly and confidently, or even anticipates them.

2. 1 - Child has so much trouble understanding content that s/he gives up.

   2 - Child has great difficulty in understanding content and asks for help.

   3 - Child has some difficulty in understanding content, but gets by without help.

   4 - Child has only a little difficulty understanding content.

   5 - Child grasps content quickly and confidently.

19. 1 - C has so much trouble typing that s/he gives up.

   2 - C has so much trouble typing that asks for help.

   3 - C has a fair amount of difficulty typing but gets by.

   4 - C has only a little difficulty in typing.

   5 - C is confident in typing, has no difficulty.

20. 1 - C has so much trouble operating audio (changing discs, getting discs, etc.) that s/he gives up.

   2 - C has so much trouble that s/he asks for help.

   3 - C has fair amount of trouble but gets by.

   4 - C has only a little difficulty.

   5 - C is confident in operating audio, has no difficulty.

21. 1 - C has so much trouble operating microfiche that s/he gives up.

   2 - C has so much trouble that s/he asks for help.

   3 - C has fair amount of trouble but gets by

   4 - C has only a little difficulty.

   5 - C is confident in operating microfiche, has no difficulty.

Appendix B

Classroom Observation Checklist

3/3/75

Teacher_____ School_____ Date 5 14 75
Mo/Day/Yr

Time 10:30 - 11:00 Observer [illegible] No. Children_____

CLASSROOM OBSERVATION

Codes (except where other coding specified)

1=none or never
2=low level or seldom
3=medium level or sometimes
4=high level or often
5=extremely high level or constantly
blank=no opportunity to observe

5 1000 1
04
905011
153
051475
060

A. CLASSROOM SETTING

1. Physical Setting (circle one):

a. Desks - rows + columns
(b.) Desks - informal arrangement
c. Balance of desks (tables) + activity centers
d. Activity centers predominate

never 1 2 3 4 5 constantly

2. Noise Level (circle one):

a. Quiet, children working
b. Quiet, but tense (teacher-enforced rather than spontaneous)
c. Hum of conversation
d. Noisy, children working
e. Noisy, disruptive
f. Other (describe)

never constantly

Functional Use of Space; children work at:

3. Activity Centers
4. Student desks
5. Circle or table
6. On the floor

Movement of children:

7. Raise hand for permission
8. Go to teacher for help
9. Move from student to student
10. Move from activity to activity
11. Wander looking for something to do

B. MATERIAL RESOURCES (check as many as apply)

___ 12. Textbooks in use

___ 13. Workbooks in use

___ 14. Other printed materials in use (specify):

✓ 15. Visual aids in use (specify): [illegible] daily thinks [illegible]

___ 16. Concrete materials in use (specify):

(e.g. cuisenaire rods, balance scales, structured educational games)

C. READING (check as many as apply)

Type of activity:

___ 17. Experience stories (children dictating)

___ 18. Word attack skills

___ 19. Word meaning

___ 20. Oral reading

___ 21. Silent reading

___ 22. Comprehension exercizes

___ 23. Spelling, punctuation

___ 24. Writing

___ 25. Handwriting, copying

Source of texts used:

___ 26. Textbook/workbook

___ 27. Child selected stories

___ 28. Child generated stories

___ 29. Teacher generated stories

___ 30. Games, specify:

___ 31. References to PLATO or activities based on PLATO materials

D. MATH (check as many as apply)

Type of activity:

___ 32. Introduction of rules by discovery or inductive approach

___ 33. Introduction of rules followed by examples--deductive

___ 34. Introduction of concepts, principles

✓ 35. Practicing operations, rules--drill, use of material

___ 36. Children asked for illustrations of concepts (e.g., show addition on number, draw a picture of 1/2 and 1/4, etc.)

Topic:

___ 37. Whole numbers

✓ 38. Fractions

___ 39. Decimals

___ 40. Graphing

___ 41. Geometry

___ 42. Writing open sentences, equations

___ 43. "Word problems"

___ 44. Measurement

___ 45. Estimation

___ 46. Mathematics Vocabulary ("sets," subtrahend," etc.)

✓ 47. Other:

Source of problems:

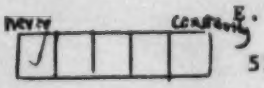
___ 48. Textbook/workbook

___ 49. Child generated problems

✓ 50. Teacher generated problems

___ 51. "Real-life" based on school or home environment

___ 52. References to PLATO or activities based on PLATO materials



E. CLASSROOM ORGANIZATION

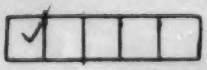
53. Teacher works with whole classroom

54. In working with the whole class, who does most of talking? (circle one

a. Teacher

b. Children

c. Teacher spends about as much time listening as talking



55. Teacher works with subgroups

56. In working with subgroups who does most of talking? (circle one)

a. Teacher

b. Children

c. Teacher spends about as much time listening as talking

1 2 3 4 5

never constantly

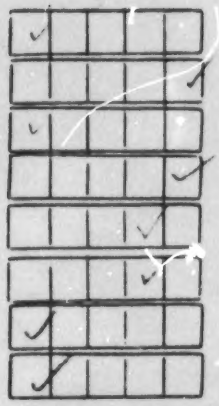
57. Teacher works with single pupils

58. In working with individual pupils, who does most of talking? (circle one)

a. Teacher

b. Children

(c) Teacher spends about as much time listening as talking



59. Same task is given for whole group--children do not interact with each oth

60. Same task is given for whole group--with discussion, interaction

61. Variety of activities going on in subgroups

62. Children engaged in individual activities, not grouped

63. Teacher directs children to activities

64. Children direct themselves, but according to schedule dictated by teacher

65. Children direct themselves according to their own interests in school work

66. Children direct themselves according to social motivation

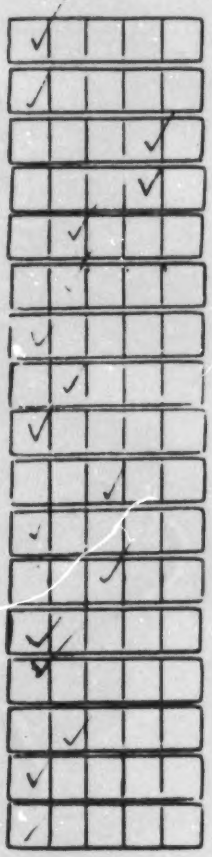
67. Shifts in activities or classroom organization are accomplished (circle on

(a) reasonably smoothly

b) in a disruptive way

F. MOTIVATION, CONTROL

Teacher maintains motivation + control by:



68. Giving of privileges, prizes, grades

69. Loss of privileges

70. Direct praise

71. Emphasizing intrinsic value of ideas or activity

72. Reminding children of rules

73. Negative statements or warnings

74. Pointing out student(s) as positive model

75. Pointing out student(s) as negative model

76. Competition

77. Cooperation

78. Commands without reasons for behavior given

79. Emphasizing reasons for behavior

80. Physical contact positive

81. Physical contact negative

82. Isolating pupil(s)

83. Having pupil sit by teacher

84. Having pupil stay after school

1 2 3 4 5
never constantly

G) CLASSROOM ATMOSPHERE

85. Hard-working atmosphere
86. Playful, joking atmosphere
87. Casual atmosphere
88. Tense atmosphere
89. Children are discouraged or prevented from expressing own experiences + judgments
90. Children express own experiences and judgments

H. DEVELOPMENT OF IDEAS

91. Discussion, relations among ideas, inquiry as instructional technique, are emphasized
92. Memorization, rote learning, as instructional technique, are emphasized
93. Attention is concentrated on particular group of students (especially bright, especially slow, noisy, boys, girls)
94. Only one answer is accepted as being correct
95. Pupil is permitted to suggest additional or alternative answers
96. Focus is on generalizations and understandings of structures or patterns
97. Focus is on facts and rules
98. Pupil is encouraged to experiment or try own ideas
99. Topics or preset plans are narrowly adhered to
100. Instruction is adjusted to student concerns and interests
101. Specific step-by-step instructions are given
102. Guidelines are given with some freedom of interpretation

I. ACADEMIC EVALUATION

103. Teacher passes judgment on p's work (positive) ("Good")
104. Teacher passes judgment on p's work (negative) ("Bad")
105. Teacher withholds judgment of p's work
106. Teacher immediately reinforces p's answer as "right" or "wrong"
107. Teacher has p decide when Q has been answered satisfactorily
108. Teacher asks another p to give answer if one p fails to answer quickly
109. Teacher provides answer to p who seems confused or puzzled
110. Teacher gives p time to sit and think, mull things over

1 2 3 4 5
never constantly

INTERACTIONS WITH PLATO

111. Teacher goes to terminal to get information from system on pupil performance
112. Teacher uses feedback from system to change p's assignment on PLATO
113. Teacher uses feedback from system to group p's for special PLATO-related instruction or remediation
114. P's are expected to leave their activities unfinished when it's their turn o PLATO
115. P's are expected to finish their activities before taking turn on PLATO
116. Teacher disciplines p's at the terminal (tells them to be quiet, keeps p's from interfering with other p's)
117. Teacher walks by terminals to observe p's work
118. Teacher helps p's at the terminal
119. Teacher uses child's turn at PLATO as reward or punishment
120 Teacher restricts child's PLATO use for educational reasons
121. Other children gather around p's at terminal

Check:

____ 122. Teacher posts schedule for PLATO use, + schedule is adhered to

____ 123. Teacher posts schedule for PLATO use, + schedule not adhered to

____ 124. Teacher posts PLATO progress chart or other indication of how p's are doing on PLATO

____ 125. PLATO-related materials are present in the room, specify:

Other children at terminals; mode of interaction:

126. Involving-work in cooperative interaction with p at terminal
127. Helping-help p at terminal with problem
128. Interfering-interact in negative way with p at terminal
129. Controlling-take over control
130. Socializing-interact in social way

K. GLOBAL IMPRESSIONS (circle one number)

131. PACING

Relaxed 1 2 (3) 4 5 Rushed

132. INVOLVEMENT

Absorbed 1 2 (3) 4 5 Bored

133. STUDENT RELATIONS

a. Cooperative 1 2 (3) 4 5 Competitive

b. Supportive 1 2 (3) 4 5 Critical

134. REWARD STRATEGIES

Approval/Privileges 1 2 (3) 4 5 Disapproval/Punishment

135. TEACHER PSYCHOLOGICAL DISTANCE

close 1 2 (3) 4 5 Aloof

136. STUDENT ABILITY TO FOLLOW INSTRUCTION

Clear Understanding (1) 2 3 4 5 Confusion

137. CONTINUITY OF INSTRUCTION

Sequence of Unrelated tasks 1 2 (3) 4 5 Thematic absorption

138. RULES- TEACHER

Seldom Mentioned 1 2 3 (4) 5 Frequently Cited

139. RULES - STUDENT

Many Apparent Rules 1 2 3 (4) 5 Apparent Rules

140. CLASSROOM DECISION MAKING

Centralized (1) 2 3 4 5 Decentralized

141. TASK CHOICE

Student Determined 1 2 3 4 (5) Teacher Determined

142. STUDENT MOVEMENT

Student Determined 1 2 3 (4) 5 Teacher Determined

143. INDIVIDUAL ATTENTION

High Emphasis 1 2 3 4 5 Low Emphasis

144. PLATO INTEGRATION

Isolated Resource 1 2 (3) 4 5 Integrated Resource

145. Teacher retains responsibility for PLATO CONTROL 1 2 3 4 (5) PLATO seen as responsible for PLATO content

146. Teacher consistency

Stable (1) 2 3 4 5 Erratic

147. PLATO problems disrupt other activities:

Never 1 2 3 4 5 Frequently

K. GLOBAL IMPRESSIONS cont'd (circle one number)

148. TEACHER ENCOURAGEMENT OF PLATO USE

Low 1 2 3 (4) 5 High

149. TEACHER ENTHUSIASM

Flat 1 2 3 (4) 5 Gung-ho

150. CLARITY OF PRESENTATION

Low 1 2 3 (4) 5 High

151. TASK ORIENTATION

"Good Times" 1 2 3 (4) 5 "You're here to learn"

152. USE OF ORGANIZERS OR STRUCTURING COMMENTS (OVERVIEWS/SUMMARIES)

Low 1 2 3 4) 5 High

153. INTELLECTUAL CHALLENGE

Low 1 2 3 (4) 5 High

154. TEACHER SEEKS TO DISCOVER CHILD'S UNDERSTANDINGS

Never 1 2 3 (4) 5 Often

155. TEACHER TAKES INTO ACCOUNT CHILD'S UNDERSTANDINGS

Never 1 2 3 (4) 5 Often

WHEN AN ITEM IS MARKED IN THE MIDDLE OF THE SCALE BECAUSE OF A COMBINATION OF LOW & HIGH INSTANCES, FOLLOW SCALE BY AN ASTERISK AND ELABORATE IN NARRATIVE.

SPECIAL CIRCUMSTANCES, COMMENTS, & ELABORATIONS.

Table 1

Observation Scale 1 Teacher Behavioral Controls

	Teacher and children observed in these activities more frequently than are other classes	Item-scale Correlation
53	Teacher works with whole classroom	.56
59	Teacher gives same task to whole group no child-child interaction	.70
63	Teacher directs children to activities	.45
69	Loss of privileges as a reward strategy	.35
72	Reminding children of rules	.48
73	Negative statements or warnings	.65
78	Commands given without reasons for behavior	.26
103	Teacher passes judgment on pupils behavior or work	.76
131	Global assessment: pacing as more "rushed"	.67
138	Global assessment: rules as more "frequently cited"	.82
142	Global assessment: student movement as more teacher determined	.81
	Teacher and children observed in these activities less frequently than are other classes	
9*	Children move from student to student	.80
10*	Children move from activity to activity	.75
61*	Variety of activities going on in subgroups	.52
62*	Children engaged in individual activities, not grouped	.48
65*	Children direct themselves according to interests	.78
105*	Teacher withholds judgment of pupils' behavior or work	.07

Table 1 continued

121* Children gather around other pupils at terminals	.46
139* Global assessment: few apparent rules for children	.81
140* Global assessment: classroom decision making as decentralized	.71

Alpha reliability of sum of standardized items = .89

Table 2

Observation Scale 2 Teacher Input

Teacher and children relatively more frequently observed in these activities	Item-scale Correlation
101 Specific step-by-step instructions are given	.42
106 Teacher immediately reinforces pupil's answer	.42
141 Global assessment of task choice as more teacher determined	.59
Teacher and children relatively less frequently observed in these activities	
54* In working with whole class, children do most of talking	.34
56* In working with subgroups, children do most of talking	.38
57* Teacher works with single pupils	.45
58* In working with individual pupils, child does most talking	.24
100* Instruction is adjusted to student concerns and interests	.60
102* Guidelines are given with some freedom of interpretation	.61
107* Teacher has pupil decide when question has been answered satisfactorily	.63
110* Teacher gives pupil time to sit and think, mull things over	.62

Alpha reliability of sum of standardized scores = .67

Table 3

Scale 3 Narrow Focus: Reading

	Teacher and children relatively more frequently observed in these activities	Item-scale Correlation
23	Spelling, punctuation	.05
26	Using textbook/workbook	.42
92	Emphasis on memorization, rote learning, as instructional technique	.72
94	Only one answer is accepted as being correct	.55
97	Focus is on facts and rules	.70
143	Global judgment of lower emphasis on individual attention	.42
	Teacher and children relatively less frequently observed in these activities	
15*	Visual aids in use	.13
16*	Concrete materials in use	.35
17*	Experience stories (children dictating)	.36
29*	Teacher-generated stories	.31
30*	Games	.41
90*	Children express own experiences and judgments	.71
91*	Emphasis on discussion, relationships among ideas, inquiry as instructional techniques	.67
95*	Pupil is permitted to suggest additional or alternative answers	.64
96*	Focus is on generalizations and understanding of structures or patterns	.62

Alpha = .75

Table 4

Scale 4 Narrow Focus: Mathematics

Teacher and children relatively more frequently observed in these activities	Item-scale Correlation
92 Emphasis on memorization, rote learning as instructional technique	.73
94 Only one answer accepted as being correct	.49
97 Focus is on facts and rules	.61
99 Topics or preset plans are narrowly adhered to	.40
143 Global judgment of lower emphasis on individual attention	.31
Teacher and children relatively less frequently observed in these activities	
15* Visual aids in use	.15
32* Introduction of rules by discovery or inductive approach	.55
36* Children asked for illustrations of concepts	.50
44* Measurement as topic	.40
45* Estimation as topic	.60
49* Child-generated problems (as opposed to textbook or workbook)	.47
50* Teacher-generated problems (as opposed to textbook or workbook)	.45
51* Real-life problems (as opposed to textbook or workbook)	.13
90* Children express own experiences and judgments	.67
91* Emphasis on discussion, relationships among ideas, inquiry as instructional techniques	.71
95* Pupil is permitted to suggest additional or alternative answers	.56
96* Focus is on generalizations and understanding of structures and patterns	.71

Alpha = .81

Table 5

Involvement with PLATO

	Teacher and children relatively more frequently observed in these activities	Item-scale Correlation
113	Teacher uses feedback from PLATO system to group pupils for special PLATO-related instruction or remediation	.58
116	Teacher disciplines pupils at PLATO terminals (tells them to be quiet, keeps children from interfering with others' work)	.47
117	Teacher walks by terminals to observe pupils' work	.65
118	Teacher helps pupils at the terminal	.60
144	Global assessment of PLATO as a more integrated resource in the classroom	.45

Alpha = .41

Table 6

Relations among classroom observation scales (n = 57)

	TC	TI	NFR	NFM	PLATO
TC	(.89)	.68	.32	.42	-.18
TI		(.67)	.59	.54	-.06
NFR			(.75)	.78*	-.05
NFM				(.81)	-.13
PLATO					(.41)

The main diagonal entries are coefficient alpha reliabilities. TC: Teacher control. TI: Teacher input. NFR: Narrow focus in reading. NFM: Narrow focus in mathematics. *Spuriously high correlation because of overlapping items.